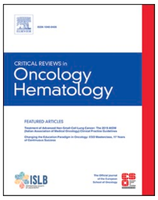
Critical Reviews in Oncology / Hematology 173 (2022) 103656

Contents lists available at ScienceDirect

Critical Reviews in Oncology / Hematology

journal homepage: www.elsevier.com/locate/critrevonc



Organisation of cancer care in troubling times: A scoping review of expert guidelines and their implementation during the COVID-19 pandemic

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ARTICLE INFO

Keywords:
COVID-19
Cancer
Triage
Guidelines
Recommendations
Person-centered care
Quality care
Ethics

ABSTRACT

This scoping review mapped the main themes in existing expert guidelines for cancer care issued during the COVID-19 crisis from the period of March 2020-August 2021. The guidelines published during the research period principally relate to the first two waves in Europe and until the beginning of the vaccination campaign. They elaborated recommendations for cancer care reorganisation, in particular triage and quality of care issues. The article highlights the ethical, epistemological, as well as practical reasons that guidelines were not always followed to provide some lessons learned for future crises to enable better guideline development processes. We also elaborate early evidence on the impact of triage decisions and different perspectives on cancer care reorganisation from ethics and social science literature.

1. Introduction

The COVID-19 crisis has significantly affected cancer care delivery by forcing the emergency reorganisation of services. The pandemic disrupted the entire spectrum of cancer care, including delaying diagnoses and treatment, altering treatment pathways, and halting clinical trials (Richards et al., 2020). Expert societies at both national and international levels responded by quickly developing guidelines to guide cancer care. Despite the considerable number of articles published for both overall hospital reorganization as well as by cancer specialties, experts had very little evidence to rely on when drafting such guidelines (Gligorov et al., 2020). Previous epidemics were of little use, as they did not have the dramatic, systemic, and long-term effect that the COVID-19 crisis has had so far (El Amrani et al., 2020). Because of the novel situation, guidelines were developed based upon recognized consensus processes, in particular modified forms of the Delphi process conducted largely via online discussions (see for instance: McCarthy et al., 2021; Bhandari et al., 2020; Martin-Broto et al., 2020; Sawhney et al., 2020; Guckenberger et al., 2020; Mehanna et al., 2020). The gold standard in guidelines were considered those developed by North American and European experts' groups, such as the European Society of Medical Oncology (Classe et al., 2020). However regional resources have also been developed and used, particularly in the Asia-Pacific region (Shiina et al., 2020), or to adapt to local resources and/or legislation.

The aim of the scoping review was to summarize the main themes in the guidelines published by national and international expert societies in order to better understand how cancer care was modified during the pandemic. However, in order to provide some lessons learned for future crises, in the discussion section we also provided an analysis on why or why not guidelines were followed, some early findings of impact of cancer care reorganization, and the main differences between guidelines published in medical literature and in ethics and social science literature to better understand what alternative frameworks have been proposed.

2. Methods

We used the methodology of a scoping review as detailed by Munn et al. (2018) to map existing evidence on expert guidelines of the COVID-19 crisis produced for cancer care during the period of March 2020 – August 2021 to better understand how cancer care was organised during the pandemic. In addition, as we sought to understand if guidelines were followed and to provide some early evidence on the impact of

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https://doi.org/10.1016/j.critrevonc.2022.103656
Received 27 December 2021; Received in revised form 15 March 2022; Accepted 18 March 2022

cancer care reorganisation, we also included articles which offered empirical data relative to impact and articles offering an analysis on implementation challenges. As a second step, we also searched for research on guidelines and triage decisions in ethics and social science literature to spot different interpretations of how to reorganize cancer care during the crisis. See Fig. 1 for the methodology of the scoping review.

We sourced articles from PubMed with the key words COVID-19/guidelines/cancer to conduct a wide search on our topic. A total of 914 articles in English were sourced via the key word search using the period March 2020-August 2021, of which 121 articles were identified as meeting our qualifying criteria for expert guidelines detailed below and 33 for articles in social sciences and ethics literature. A single source of information (PubMed) was principally used as the source of information given the extensive thematic coverage allowed by the keyword search; however, articles published in social science literature were also searched for directly via 6 journal websites (Journal of Medical Ethics, American Journal of Bioethics, Social Science and Medicine, BMC Medical Ethics, Bioethics, Journal of Bioethical Enquiry) to identify relevant sources not linked to PubMed. Given the rapidly changing recommendations for COVID-19 vaccination as well as developing literature that is becoming available on the impact of cancer care organisation, the sections on COVID-19 vaccination and on impact have been updated up to February 2022 to identify emerging literature on the subject, which led to inclusion of 21 more articles in the review.

The scope of the review included those recommendations published by national and international expert panels. We also included other rapid, systematic, or literature reviews if appropriate to compare/contrast with our findings. For the discussion section, we included social science and ethics articles related to guidelines and the pandemic; empirical evidence on impact; and articles that discuss why guidelines were/were not followed. Reasons for exclusion included those articles outside of the subject, those articles that demonstrated an insufficient quality, when an updated guideline had been published since the original publication date, and/or when guidelines were from sources outside of expert panels. In the literature, published guidelines came from a diversity of sources, including (1) recommendations of single or multiple authors, (2) recommendations of single cancer centers, (3) recommendations of national and international expert panels, (4) recommendations from multicenter groups, (5) official guidelines or recommendations of national health authorities (Zaniboni et al., 2020). Guidelines from (1), (2), (4) were excluded from our review unless they

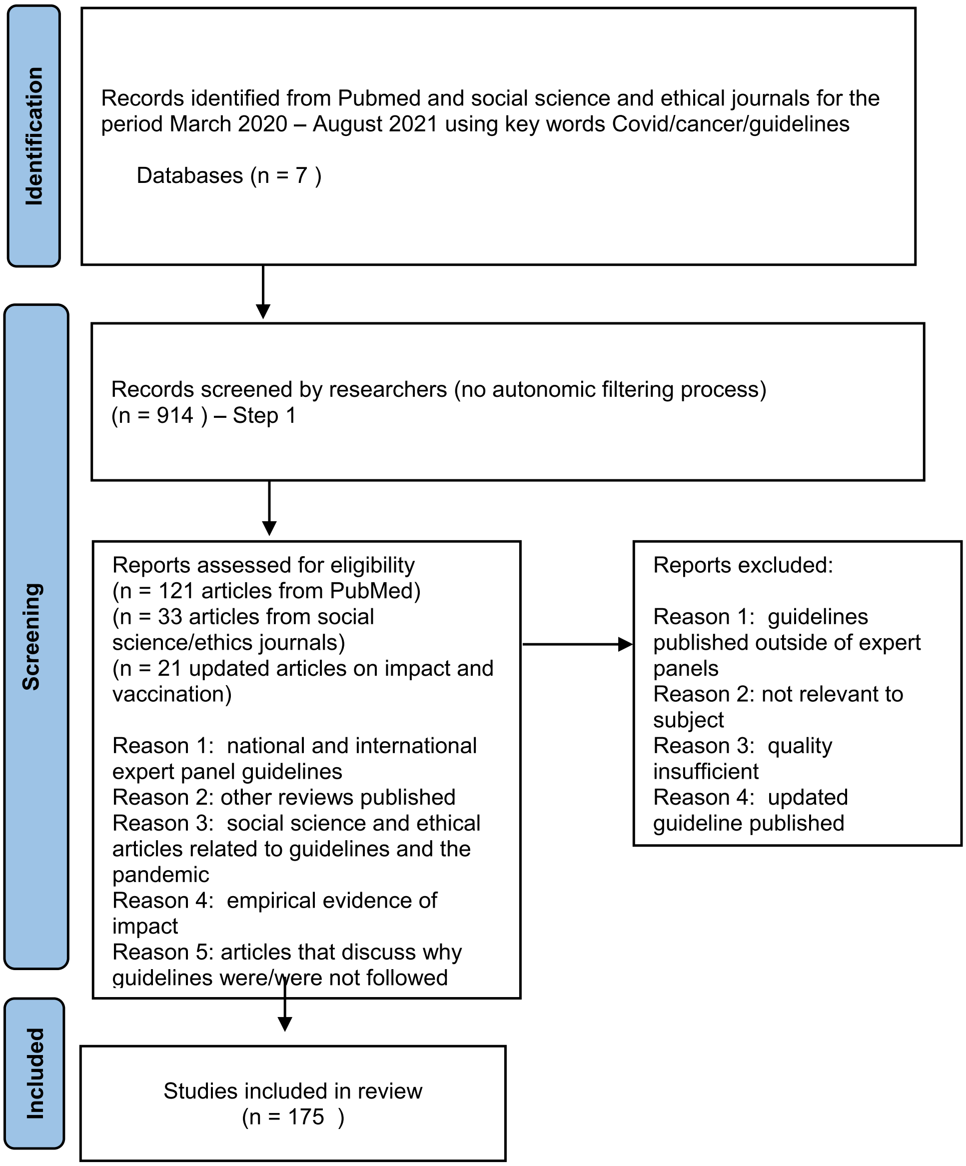

Fig. 1. Methodology of scoping review.

gave some critical analysis of expert guidelines and/or reasons for divergence. As these articles transmitted field experience, lessons learned even from a single source were considered useful to contribute to the overall discussion on why (or why not) guidelines were followed.

The guidelines published relate mainly to the first crisis period (March 2020-June 2020), which corresponds roughly to the first lockdowns in the Northern Hemisphere. There is an increasing number of studies showing the impact of cancer care reorganization, in particular the effects of delayed diagnosis and treatment. These early findings are presented in the discussion section to give some evidence on the impact and have been updated as of February 2022.

3. Results

Professional societies produced both specific guidelines for their cancer type as well as general guidelines for overall cancer care reorganization. Guidelines specified patients' triage, specific recommendations by age group, as well as procedures for the reorganization of cancer care. The majority of published recommendations were for the first wave of the pandemic, where triage followed a more radical approach, although they have been followed to varying degrees as the pandemic continued. Although limited thus far in the literature, the difference between these early guidelines and later ones are elaborated in the results section.

The results are organized in three sections: (1) triage guidelines (including diagnosis, surgery, chemotherapy, and age-specific factors); (2) guidelines for general organization of cancer care; (3) the most up-to-date guidelines at the time of writing of COVID vaccination for cancer patients.

As our scope was for guidelines published by international and national expert panels, most guidelines identified by the review reflect those published in the Northern Hemisphere. They also largely deal with the first wave when triage decisions were most radical, although these guidelines were updated as more evidence became available. Regional and/or time period differences are highlighted in this section when pertinent. As there were some important differences between guidelines published in high income and low income countries, these differences are highlighted in the discussion section to show the need for locally-developed (or modified) guidelines in those countries which face significant resource restraints.

3.1. Triage

During the first wave, guidelines for various cancers recommended a radical approach designed to limit hospitalizations and influx at treatment centers (Madan et al., 2020). It was largely recommended that surgery should be delayed where possible to minimize the use of scarce resources and reduce the risk of COVID-19 infection. For chemotherapy treatment, guidelines suggested to transition to oral therapies where possible, as well as the use of neoadjuvant therapies to delay surgery safely. There was an overall tendency to shorten radiation treatments or use of hypo-fractionated (Hypo-F) regimens and reduced dosages. As for palliative care, increasing the duration of the treatment cycle and delaying treatments with a slow disease progression such as metastatic breast cancer, colorectal metastatic breast cancer, colon-rectal cancer or prostate cancer was recommended. Curative treatments were also privileged over palliative treatments (Grellety et al., 2020).

Guidelines recommended that patients be triaged according to a tiered approach (Tartarone and Lerose, 2020). Although these tiers varied, it was generally considered that non-urgent cases could delay treatment for a certain amount of time without affecting overall outcomes. The time recommended varied considerably in the literature; however, the general "safe" wait" time was considered between 2 and 6 months. Tumour-origin, functional status, growth rate, grade, differentiation status, and overall disease burden were also to be taken into consideration to determine risk/benefit ratios. For a summary of the main triage related guidelines, please see Table 1.

Diagnostics and screening: were largely delayed and/or stopped during the first wave of the pandemic (Gligorov et al., 2020). Guidelines recommended that if screening were to proceed, it should take place outside of the hospital and that biopsies for those with a low index of suspicion for cancer, should be postponed until out of crisis mode (for instance see: Cakir et al., 2021). Singaporean guidelines for breast cancer (Chan et al., 2020) suggest that a first triage be done by generalists and only those tumors suspected to be malignant and/or high risk be treated during the crisis stage. Likewise French (Classe et al., 2020) and Chinese guidelines published early in the pandemic (Liu et al., 2020) recommended minimizing diagnostic surgery and/or using non-contact diagnostic and screening resources such as DNA-based stool samples instead of a colonoscopy or favoring the use of biopsies by endoscopy or interventional radiology rather than surgical procedures.

The strategy for diagnosis and screening after the first wave largely corresponded to triage strategies put into place during the height of the pandemic (Gligorov et al., 2020), as it proposed to largely delay non-urgent cases for a reasonable wait time to deal with the backlog (between 3 and 6 months). For example, in the case of breast cancer diagnosis and screening activities in France (Ceugnart et al., 2020), the tiers corresponded to high priority (appointments given quickly);

Table 1
Triage related guidelines.

Theme	Guidelines	Discussion
Diagnostics/ screening	Delayed or stopped during first crisis period and immediately following it; triage of early stage or biopsies for those with a low index of suspicion for cancer outside of the hospital.	During the post-lockdown period, the same triage guidelines were followed to deal with backlogs. A large amount of discussion exists about the effects of postponing screening but there is little data to support its impact at the current time.
Surgery	Recommended to be postponed where possible if surgery is semi-urgent, particularly to delay elective surgeries in the first wave; however, regulations differ among regions.	Delaying surgery caused significant controversy among the medical community and was quickly resumed after the first lockdowns in most cancer centers.
Chemotherapy	Postponement not recommended but preference for oral treatments or the use of neoadjuvant chemotherapy to delay surgery where possible. However, to be to be considered on a case-by-case basis based upon urgency of treatment and risk of cancer progression.	Postponement thought to cause large influx of patients but not yet evidenced in literature.
Radiotherapy	Tendency to shorter RT rather than postpone or omit it. The use of hypo-fractionated (Hypo-F) regimens and reduced dosages were suggested.	Difficult for some to follow as not all alternatives are available/feasible in low resource settings (in particular Hypo-F).
Supportive care	Limited to essential care, with a preference for teleconsultations.	Psychological support and encouragement of physical activities, as well as to deal with possible side effects of therapy.
Palliative care	To be delayed where expected efficacy was modest, or to change the duration of the treatment cycle.	Patients with low disease burden or slow progression were generally not prioritized; however, they were referred to supportive care.
Integrative oncology	Largely moved online and focused on quality-of-life concerns and symptom management.	Downplayed during the pandemic, which resulted in some treatments becoming inaccessible.

medium priority (notably for those with breast cancer in the family or for follow-up survivors, an appointment given within 3 months); and low priority for issues such as screening mammography in the general population without symptoms (an appointment given within 6 months). The actual practices by cancer center and country during subsequent waves merit further research.

Surgery: during the first wave, surgery was seen as case-dependent but European and North American guidelines generally recommended that they should be postponed until there are adequate resources, in particular for elective surgeries (Classe et al., 2020; Dziodzio et al., 2021; Bouthillier et al., 2021; Cavaliere et al., 2021). However primary surgeries not recommended to be delayed included the removal of brain, breast, colon, stomach, pancreas, liver, bladder, kidney, and lung tumors. Guidelines recommended that patients should be treated in COVID-19 free areas and be tested for COVID-19 prior to the surgical procedure and low occupancies of the operating room, fast hospital discharge, ensuring a low rate of complications, and avoidance of COVID-19 infection (Fancellu et al., 2021).

Discussion in the literature notes the general discouragement of surgery due to risks during this first wave. However, we found international differences which likely are explained by the differing COVID-19 prevalence. For instance, guidelines published for cancer care in South Korea do not recommend deferring surgery (Lee et al., 2021) compared to guidelines published in Europe in the same period. Even when surgery was delayed in these countries, there remained significant contention in the medical community. For instance, in a review of international guidelines for head and neck oncology management (Gascon et al., 2021), it was noted that prioritizing radiation over surgery may have increased the risk of contamination of patients and staff. Guidelines that are now coming out from the second wave largely recommend not to delay surgery (Tougeron et al., 2021) and to restart elective surgery by weighing cost and benefit (Wohler et al., 2021). More research on the impact of delaying surgery is expected.

Chemotherapy: even though chemotherapy may increase the risk of COVID-19 exposure and infection, and cancer progression may be exacerbated by COVID-19 elicited inflammatory signals (Liu et al., 2020), its postponement was generally not recommended in the guidelines (Gundavda and Gundavda, 2020). However, guidelines did recommend giving preference to oral treatments (in metastatic breast or colorectal cancers), spacing injections for a longer time, or favoring injections that can be given via hospitalization at home (Rodriguez-Freixinos et al., 2021). In addition, it was recommended that neoadjuvant chemotherapy (e.g., rectal cancers), hormone therapy (e.g., breast, prostate cancers), chemoradiotherapy (e.g., rectal, prostate cancers), or pre-operative radiotherapy could be used as a means for safely delaying surgery. A number of authors cautioned that this may cause a large influx of patients in the post-crisis period (Rodriguez-Freixinos et al., 2021); although this is has not yet been evidenced in literature.

Radiotherapy: while the need for radiotherapy (RT) was to be determined on a case-by-case basis, guidelines suggested either deferring or delaying RT during the first wave (Siavashpour et al., 2021; Rodriguez-Freixinos et al., 2021). However, in general there was a tendency to shorten RT rather than postpone or omit it (Oertel et al., 2020). When appropriate, it was suggested that radiotherapy be delivered with hypo-fractionated regimens to reduce face-to-face interactions (Gligorov et al., 2020; Liu et al., 2020). Guidelines have also given advice on safety, avoidance, rescheduling (deferring/delaying RT) and shortening RT. These recommendations were not always adapted to local resources, particularly in some Asian and African countries which did not have advanced radiotherapy facilities and techniques.

Supportive, palliative, and integrative care: travel by support providers during the crisis was limited to essential care, with most care provided by teleconsultation. Guidelines recommended provision of psychological support as well as encouraging patients to pursue physical activities (Gligorov et al., 2020). Specific guidelines were also produced in relation to neutropenia, anemia and iron deficiency, thromboembolic events and thrombocytopenia-related complications, chemotherapy-induced nausea, and vomiting (Aapro et al., 2021). Palliative care was recommended to be delayed where expected efficacy was modest, for maintenance therapies, and/or patients with low disease burden and slow progression. It was also recommended to delay non-urgent imaging, and if possible, to increase the duration of the treatment cycle or choose alternative dose schedules. Oral agents or non-i.v. methods were preferred (if anticipated efficacy is similar), and patients were recommended to be referred to best supportive care such as home hospice services (Chan et al., 2020).

In terms of integrative oncology, although the Society for Integrative Oncology (SIO) Online Task Force published recommendations to provide effective and safe online consultations and treatments for quality-of-life-concerns and symptom management (Ben-Arye et al., 2021), integrative oncology was downplayed during the pandemic, with some treatments deemed non-essential and made inaccessible to patients, despite research showing that cancer patients and survivors were experiencing heightened levels of mental health issues. However online treatments recommended included manual, acupuncture, movement, mind-body, herbal, and expressive art therapies.

Guidelines for specific age groups: although there is still insufficient data to support recommendations applicable to children and adolescents, guidelines recommended that the most experienced practitioners help to decide, on a case-by-case basis, which treatments should be continued or delayed. In addition, some specific recommendations have been proposed, such as for leukemia, and are expected to be updated when more evidence becomes available (Rouger-Gaudichon et al., 2021). On the other side of the spectrum, while guidelines on care for older patients were published, particularly those developed by the International Society of Geriatric Oncology (SIOG) COVID-19 Working Group, these guidelines were not always available/known to professionals (Battisti et al., 2020). The ESMO did not publish specific guidelines but recommended “more intensive” surveillance, especially for those with co-morbidity, but without specific recommendations (Kamposioras et al., 2020).

3.2. *Organisation of cancer care during the pandemic*

This section will detail how cancer care was organized during the pandemic relating to COVID-19 patient and staff management and communication and the role of multidisciplinary tumor boards.

First of all, limiting hospital access was recommended during the first wave, notably by postponing appointments and switching to telemedicine. Lesser priority patients such as cancer survivors were recommended to avoid unnecessary in-hospital visits, imaging, and consultations (Raymond et al., 2020). There were also guidelines (notably from the American Society of Clinical Oncology) which recommended minimizing hospital influx and risk by establishing triage stations outside the clinic (Tartarone and Lerose, 2020). For outpatients, telemedicine and home care was recommended and clinical visits postponed. Where scans were needed, it was recommended that they be done locally to reduce in-person visits (Rodriguez-Freixinos et al., 2021). Where outpatient in-person consultations were needed, guidelines corresponded with overall COVID-19 risk management guidelines (masks, social distancing in patient waiting areas, etc.).

In terms of patient care for those with COVID-19, guidelines during the first wave largely recommended delaying treatment if the patient tested positive for COVID-19 or showed COVID-19-like symptoms. The time varied depending on the guidelines and specialty but recommended on average 14 days (Reidy-Lagunes et al., 2021; Farah et al., 2021). It is estimated that these guidelines will continue to be adapted as more evidence becomes available. For inpatients, COVID-19-designated wards/intensive care units/operating rooms/hospitals were recommended as well as pooling resources such as shifting patients to COVID-19-free units/hospitals (Gundavda and Gundavda, 2020). As in other services, it was recommended to restrict the number of visitors (Uwins et al., 2020). Guidelines also recommended to isolate chemotherapy units from COVID-19 care facilities (however it is to be noted that this is more feasible in specialized cancer centers than in general hospitals). If this was not possible, it was recommended to separate COVID-19 positive and negative patients and to isolate chemotherapy units from COVID-19 care facilities.

Staff training in personal protection equipment, identification of suspected COVID-19 patients, as well as improving awareness through national and international webinars was recommended. It was also suggested that staff have access to psychological support given increased risk of burn-out during the crisis (Classe et al., 2020; Hlubocky et al., 2021), as well as putting into place strategies for reducing the risks for immunocompromised staff or those with significant co-morbidities (such as reassignment of clinical duties to administrative roles). Guidelines also maintained the need for a strict "stay at home when ill" policy. Multidisciplinary meetings were maintained but streamlined and largely moved online and gave priority to complex cases (Classe et al., 2020; Gligorov et al., 2020, Rodriguez-Freixinos et al., 2021). As in other hospital services, measures put into place to protect healthcare workers and patients, such as protection equipment, social distancing, and systematic COVID-19 testing, were recommended.

Given that surgery represents specific risks, it was also recommended to adapt techniques to reduce the risks of exposure of caregivers in the surgical theater. For instance, in the early stages of the pandemic, there was considerable concern with open surgery, and guidelines recommended that surgeons should attempt to avoid exposure to aerosolized viral particles and reduce operative times (Classe et al., 2020; Raymond et al., 2020); however, this specific risk factor for surgery also led to surgery being significantly reduced. Articles are now being published that show that with appropriate personal protective equipment and appropriate procedural modification to prevent viral transmission, surgery was able to safely continue in many centers (Fraser et al., 2021).

In terms of patient communication, guidelines recommended that patient-provider communication be fully integrated into cancer treatment during the crisis using a person-centered approach. This specifically included: a.) educating patients about recent COVID-19 guidelines and deviation of standard care, such as the use of telemedicine, drug storages, or different treatment options (Gligorov et al., 2020; Gundavda and Gundavda, 2020; Tartarone and Lerose, 2020; Hwang et al., 2020); b.) engaging patients and caregivers to safely continue home treatment and medication (Gligorov et al., 2020), including establishing helplines operated by specialist nurses to render supportive care advice (Chan et al., 2020); c.) educating patients on the high risk of complications for cancer patients (Friese et al., 2021); d.) paying attention to patients' psychological health (Classe et al., 2020; Rodriguez-Freixinos et al., 2021).

Finally, the importance of tumor boards is advocated consistently in literature; however their actual use during the pandemic merits further research. Tumor boards have helped deal with triage considerations, for instance in deciding whether to proceed with surgery or to discuss alternative therapeutic approaches (Moletta et al., 2020). The use of virtual technologies also helped tumor boards to proceed in spite of restrictions (Garg et al., 2020). It has been suggested that the use of tumor boards may have been one of the factors leading to delays in comprehensive cancer centers (Obeng-Gyasi et al., 2021); however, the need for consensus-driven decision-making was important for triage-related decisions in a time of resource shortage (Hwang et al., 2020; Chan et al., 2020).

3.3. COVID-19 vaccination

This section has been updated up to February 2022 to provide the most up-to-date information on Covid-19 vaccination guidelines.

Patients with cancer were originally excluded from clinical trials of COVID-19 vaccines; thus, evidence is lacking for this patient group (Kharmoum and El M'Rabet, 2021), although clinical trials are ongoing at the time of writing. Before the pandemic, there was limited data on immunogenicity and immune response to antiviral vaccination in cancer patients, and the only data available was for the influenza vaccination.

The European Society for Medical Oncology (ESMO, 2021) has released 23 statements on vaccination for COVID in people with cancer based upon research which is starting to become available at the time of writing. The research has shown that overall people with cancer have clinically relevant seroconversion rates after undergoing a full COVID-19 vaccination course. While the number of doses of vaccines required in cancer patients to generate an adequate vaccine response is not yet confirmed, data has shown that a third booster shot could further increase the level of protection. At the time of writing, vaccination of cancer patients is therefore strongly encouraged, even if vaccination may not be as effective due to immunosuppression, particularly for those with haematological malignancies. It is recommended that future studies evaluate different approaches to enhance oncological patients' immune response (Becerril-Gaitan et al., 2022).

At the time of writing, it was assumed that most patients with cancer can safely have a mRNA vaccine; however, data is missing on other types of vaccines, which have not focused specifically on cancer patients (Giesen et al., 2021). Guidelines are also starting to be published on the benefit-risk factor of certain groups, although there still lacks strong consensus (Thirumalairaj et al., 2021). In terms of patient acceptability, although there are continued worries from patients about the side effects of vaccines for cancer patients, real-world and clinical trial data showing the effectiveness and safety of the vaccine on cancer patients is helping to reassure patients and oncologists (Matovina Brko et al., 2021).

At the time of writing, recommendations in Covid-19 vaccine timing in patients undergoing active cancer therapy vary depending on specialty and cancer type, and the timing of the vaccine can be personalized to allow maximum treatment efficacy and disease control. For instance, for elective surgeries, it has been recommended to have the vaccine at least 2 weeks prior to mount immune response before surgery, while for emergency surgery at least 4 weeks has been recommended (Gundavda and Gundavda, 2021). A specific problem identified in literature is also related to vaccination-associated adenopathy after administration of COVID-19 vaccines, which may lead to a diagnostic conundrum in patients with manifest or suspected cancer in whom it may require a lympadenectomy for definitive diagnosis (Becker et al., 2021). Recommendations on vaccine timing for specific groups and treatments will likely be updated in the coming months as more evidence becomes available.

4. Discussion

4.1. Were guidelines followed?

Some studies suggest that the guidelines were largely followed in certain specialties or in comprehensive cancer centers (Boehm et al., 2020; Frelaut et al., 2021, Basse et al., 2021); however, the highly contextualized nature of these studies makes it difficult to generalize. One study conducted in urology reported that European countries appear to be following the guidelines most closely compared to other regions (Gravas et al., 2020), but this finding will need to be confirmed with further studies. It should also be considered that guidelines were largely published for North America and European contexts, which may account for their healthcare providers being able to follow them. For an overview, please see Table 2.

4.1.1. Epistemological issues

Several challenges have been identified with following established guidelines during the pandemic. Firstly, the sheer number of guidelines and their rapid changes has made it difficult to follow them accurately. For instance, a retrospective study of ENT (Cernei et al., 2021) found that 175 guidelines were published by international organizations

Table 2
Challenges with guidelines and lessons learned.

Challenges with guidelines	Lessons learned
Large number of guidelines published	Need to disseminate information from high-level organizations down to area-specific advice to ensure that there are no disparities in implementation.
Guidelines not fully comprehensive/gaps	Training for specific groups; recommendations needed in pharmacy and dentistry; evaluations of guidelines by clinicians needed to better understand gaps.
Guidelines unclear and conflicting	Need to harmonize guidelines at national and international levels.
Lack of strong evidence of guidelines produced	Not following guidelines may lead to disparities and injustices for individual patients. Need for studies to obtain a strong evidence base for triage and other related decisions for future crises.
Differences in practices/interpretations along the healthcare trajectory	Training needed across the healthcare spectrum to avoid disparities.
Ethical concerns with guidelines, leading to moral distress	Interdisciplinary ethical reflection needed to discuss impact of the guidelines on healthcare professionals.
Competing priorities and/or strained resources	Need to develop guidelines for specific contexts.
Variable implementation according to cancer center	Need to study whether this is specific to the crisis or independent of it.

(29%), national organizations (32%) and 38% by ENT specific organizations, with a peak guidance produced in the last two weeks of March 2020. Because multiple bodies interpreting the guidance gave an opportunity for confusion and delays, there is a need to find better ways to disseminate information from high-level organizations down to area-specific advice to ensure that there are no disparities.

Guidelines were also continuously revised during the pandemic as new evidence became available. One of the main recommendations concerned changing evidence on the risk of laparoscopy. As Rebecchi et al. (2021) explained, the UK's Intercollegiate General Surgery Guidance (IGSG) provided recommendations on March 26th which recommended not to use laparoscopy. Subsequently recommendations were updated on June 5th in which the society no longer discouraged its use. However, in the time between the release of these two guidelines, hospitals increased their use of open resections to align with these recommendations to avoid a minimally invasive approach, which had a downstream impact on patient care and recovery.

It has also been noted that guidelines have also been unclear and even conflicting (Dell'Oglio et al., 2021; Huang et al., 2021; Garg et al., 2020; Benbrahim et al., 2021). For instance, Huang et al. (2021) highlight that guidance in reference to reconstructive surgery has been less clear than in areas such as urgent surgical treatment. In another case, low applicability of guidelines was evidenced when they conflicted with regional guidelines established before the crisis, in particular high priority treatments (Dell'Oglio et al., 2021). Likewise, Benbrahim et al. (2021) discuss the difficulty on implementing guidelines when scientific literature is conflicting, such as on the use of corticosteroids. Finally, Garg et al. (2020) explain that guidelines can be conflicting due to differences in the national healthcare systems or different demographic profiles of patients vs. national resources available.

Another problem was that guidelines were not always fully comprehensive. For instance, as a case study by Sawaya et al. (2021) shows, gaps in recommendations left healthcare providers to their individual judgment and the hospital was forced to organize internally. A study by BrintzenhofeSzoc et al. (2021) has also showed that providers were not necessarily aware of guidelines produced for specific groups such as older cancer patients, which left triage decisions up to their individual judgement or in line with interpretations of other guidelines. The literature also notes gaps in recommendations such in pharmacy (Pourroy et al., 2020) and in dentistry (Yadav et al., 2020) for cancer, leaving these providers also with little guidance.

Given the delay between the onset of the pandemic and the release of guidelines from cancer societies and networks, this led to variable responses of individual centers. A survey conducted by Vasiliadou et al. (2021) for the period from February 2020 to July 2020 noted evident differences across UK centers in head and neck oncology in feeding tube policies, RT dose and fractionation, as well as concurrent chemotherapy use. The study however noted considerable variation in many aspects of practice *prior* to the onset of the pandemic; thus, it should be taken into consideration that the issues with following guidelines are not new to the pandemic and might have simply been further augmented.

Guidelines were also not followed in some cases because of the lack of strong evidence (Rebecchi et al., 2021). This gave clinicians a sense of liberty in choosing whether or not to use them. According to Nahm et al. (2021), *"these guidelines…are designed to help decision making rather than limit choice and physicians should interpret them as they feel appropriate for their local circumstances and priorities."* It is therefore not surprising that they were not necessarily followed and that a case-by-case approach was favored by some cancer treatment centers. For instance, in a study conducted by Freeman et al. (2020) in the United States in relation to head and neck oncology, it was found that specialists avoided rigid procedure-specific guidelines, instead favoring a case-by-case approach that was flexible in relation to local resource limitations and the varied risks posed by particular procedures. However, the authors noted not following guidelines could lead to disparities and injustices for individual patients; therefore, there is a need to conduct more research on evidence base for triage decisions.

There is also the issue of guidelines not being followed in the healthcare trajectory. According to Xiao et al. (2021), the backlog and urgency to identify those patients that needed treatment the most has at least partly been caused by recommendations not being followed incorrectly. The study found that nearly one-quarter of colonoscopies were scheduled inappropriately due to incorrectly applied family history guidelines, as well as misapplication of both recent and older guidelines. The source of this problem was primary care providers and/or the colonoscopist, who did not follow or agree with existing guidelines. This indicates that further training is needed on guidelines across the healthcare spectrum to better understand their interpretation and to avoid disparities.

4.1.2. Ethical issues

The decision not to follow guidelines also has to do with ethical concerns, in particular what healthcare providers consider "good care." As Ballatore et al. (2020), highlight, although guidelines provided a general outline, healthcare providers were also left with numerous ethical questions concerning individual patient care and the practical decisions that needed to be made on the ground. In addition, as they may have been based upon incomplete/poor evidence, it was thought that they could lead to wasteful and harmful practices (Hwang et al., 2020) and that their generality did not allow for personalized care.

Hwang et al. (2020) suggest that these problems can lead to moral distress for physicians, especially when this means postponing operations or diverting patients to less effective pathways. Moral distress comes about when providers believe the right action is not taken because of institutional rules or other factors. It occurs in triage-related decisions as they conflict with what healthcare professionals see as their core values and principles. Moral distress has been an important factor in the stress and burn-out felt by healthcare providers during the pandemic (McGuire et al., 2020; Delany et al., 2021; Delgado et al., 2021). It is to be noted that even when healthcare providers agree with these principles, they still may experience moral distress as they will have to live with the decisions taken and the results of those decisions. While some studies (see for example: Ballatore et al., 2021) show that a majority of patients have felt reassured during the pandemic by their healthcare providers when triage decisions were necessary, patients were also significantly concerned about the risks of postponement, leading to increased psychological distress.

4.1.3. Competing priorities and/or strained resources

Finally, guidelines were also not followed due to competing priorities and strained resources. According to Mou et al. (2021), introducing a new approach to treatment can be challenging during a pandemic in larger institutions consisting of multiple geographically dispersed treatment centers, with different resources and rates of COVID-19 infection. Specifically, there was the perception that international guidelines were too general and/or did not consider the specific context on site, in particular in low-and middle-income countries which could not always propose an alternative treatment strategy or follow international guidelines due to resource shortages (Siavashpour et al., 2021; Shahzad et al., 2021; Valencia et al., 2021; Chang et al., 2020; Kochbati et al., 2020; Belkacemi et al., 2020). Several authors therefore stressed that guidelines needed to be adapted depending on the local context or depending on COVID-19 prevalence (Ibrahim et al., 2021; Dell'Oglio et al., 2021; Benbrahim et al., 2021; Sattar et al., 2021). Accordingly, societies have pointed out that recommendations should not be considered as rigid guidelines, that they should be applied individually to each patient, especially as the situation may change rapidly (Dziodzio et al., 2021). Some guidelines that have been adapted to the local context also point to the fact that they are not in line with national prevention policies put into place before the pandemic, such as the national cervical cancer screening program in Poland, which continued in spite of the crisis situation (Jach et al., 2021).

4.2. Early evidence of the impact of cancer care organization during the crisis

This section will highlight the early evidence of the impact of cancer care organization during the crisis. As it remains challenging to analyze what has been the specific impact of the guidelines, as they were not always followed (see previous section), this section relates more general findings found through the overall scoping review on the impact of cancer care reorganization. This section has been updated with studies covering the period up to February 15th, 2022 to provide the most up-to-date evidence at the time of writing.

Given that oncology departments have suffered from important reorganization of cancer care during the pandemic, recent studies have shown an important reduction in new cancer diagnoses and that more advanced stage diagnoses with a worse prognosis are expected (Cantini et al., 2022). However, it is also to be noted that some preliminary studies have shown little to no impact on the delivery of cancer care (Smith et al., 2021a, 2021b; Zahrani et al., 2021). Some of the reasons for this may reflect studies conducted in specialized cancer centers or academic institutions (Rebecchi et al., 2021) which had well-defined pathways for COVID-19 patients or who were able to defer COVID-19 patients to other hospitals. Several articles have also provided evidence that treatments that went ahead during the crisis did not have significant treatment outcomes vs. the pre-pandemic era. This was notably to advocate those procedures such as surgeries could be safely performed during the pandemic (Durand et al., 2021; Wai et al., 2021). The differences among countries and/or treatment center organization merits further research.

However, thus far the early evidence of impact has shown the most significant delays in diagnostic procedures were during the first wave when there was a more radical triage approach and patients did not necessarily seek care (Cox et al., 2021; Chazan et al., 2021; Toes-Zoutendijk et al., 2022). Modeling studies have shown that it is possible to mitigate the problems of COVID-19 waves by increasing diagnostic and treatment capacities to address the backlog during recovery phases (Malagón et al., 2022); however a number of barriers exist, including the continuation of telemedicine and the lack of full staff capacity due to the ongoing nature of the pandemic (Fisher-Borne et al., 2021). In many places in the field, cancer services have been slow to recover beyond this first wave (Donlon et al., 2021), although the pattern of recovery is variable according to institutions and countries (Bom et al., 2022).

There are an increasing number of studies becoming available on the impact of cancer reorganization on cancer patients, from the psychological impact of delaying treatment to the at-risk factors of the pandemic itself, including decreased physical activity and isolation (Islam et al., 2021; Rodriguez et al., 2021; Beebe-Dimmer et al., 2022; Salehi et al., 2022). Early evidence also suggests a disproportionate impact on vulnerable groups (Beebe-Dimmer et al., 2022; DeGroff et al., 2021). Table 3 provides a selection of studies on impact found in the literature thus far.

4.3. Discussions of guidelines and triage decisions in ethics and social sciences

Articles published in ethics and social sciences bring new light on triage decisions, as well as discussions of factors such as quality care and the psychological impact of the crisis on professionals. It is to be noted that most of these articles have been published in oncology journals and that many are by authors with medical backgrounds with an interest in social sciences and/or ethics (Kourie et al., 2020; Shuman and Pentz, 2020). This suggests that healthcare providers have turned to conceptual tools from the social sciences to better understand the reorganization of cancer care services during the pandemic. Table 4 summarizes these discussions.

5. Limitations

At the time of writing, publications are starting to be available relating to the time between and during before the second crisis period (published in July and August 2021) which recommended modified guidelines during the next phases of the pandemic, largely based upon lessons learned in terms of protective equipment or for reorganizing treatment spaces (see for instance Dreyling et al., 2021). More guidelines are expected to be published in the coming months as more evidence base is made available on the real impact of these guidelines on oncology clinical practice and patient outcomes.

6. Conclusion

This scoping review provided an overview of the main triage and cancer care reorganization recommendations in expert guidelines published since the beginning of the pandemic. It also documented why guidelines were or were not followed and highlighted lessons learned to facilitate future guideline development. Early evidence of the impact of triage decisions on cancer services was elaborated, as well as studies from ethics and social sciences. Guidelines are expected to be updated in the coming months to account for new evidence available. Further research is needed on the impact of triage on disease progression and mortality rates, as well as on patient and family experiences during the pandemic. In addition, more research is needed on implementation of guidelines in the field to better understand their actual use and limitations in the field.

Funding support

Métropole de Lyon - Cancéropôle Lyon Auvergne-Rhône-Alpes, France (CLARA) - Soutien aux projets structurants 2020; LYRICAN (INCA-DGOS-INSERM 12563), PIA Institut Convergence Francois Rabelais PLAsCAN (PLASCAN, 17-CONV-0002).

CRediT authorship contribution statement

Brenda Bogaert: Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Roles/Writing – original draft.

Table 3
Early evidence of the effects of cancer care reorganization during the pandemic.

Effect	Early studies
Reductions in diagnostic procedures	• Longcroft-Wheaton et al. (2021): investigated the impact on endoscopy services and gastrointestinal (GI) cancer diagnosis in the UK. The data demonstrated an 88% reduction in procedures during the first 6 weeks of COVID-19 crisis, resulting in 66% fewer GI cancer diagnoses. • Brown et al. (2021a): investigated the management of bone metastasis and cancer treatment-induced bone loss during the first wave worldwide. Delays in routine CT scans (58%), standard bone scans (48%), and MRI scans (46%), and palliative radiotherapy for bone pain (31%), delays to or cancellation of prophylactic surgery for bone pain (35%) were reported. • Belfiore et al. (2021): investigated the Italian experience of cancer screening programs including gynecology and mammographic exams. The research showed a decrease for all the performed exams, notably for PAP tests (−81.6%), followed by biopsies (−48.8%), second opinions (−41.7%), and surgical (−31.5%), molecular (−29.4%) and cytological (−18.1%) tests. • Cantini et al. (2022): this Italian study investigated the impact on access to lung cancer diagnosis and treatment. The research found a slight reduction (−6.9%) between the period in 2020 compared to 2019 in newly diagnosed cases and founds that newly diagnosed patients in 2022 were more likely to be diagnosed with stage IV disease. • Walker et al. (2021): this study conducted in Canada's Ontario province showed a significant reduction (−41%) in screening tests for breast, cervical, colorectal, and lung cancer in 2020 compared to 2019. This represented 951,000 fewer screening tests.
Tumour recurrence/ disease progression	• Culpan et al. (2021): Turkish study following 407 patients for follow-up cystoscopy. Showed 2–5 months delay increased risks of recurrence by 2.4-fold and delay in cystoscopy for more than 3 months increased probability by 6.7-fold. • Alagoz et al. (2021): this study uses collaborative simulation modelling to estimate the impact of pandemic-related disruptions in breast cancer, which estimate a small long-term impact as long as there are continued efforts to return to screening and minimize delays in the evaluation of symptomatic cases.
Treatment delays	• Papautsky and Hamlish (2020): a patient reported outcomes study in the UK showed that 44% of breast cancer patients reported treatment delays in all aspects of cancer care and treatment. The only variable which had a significant effect was age with younger respondents reporting a higher incidence of delays than older respondents. • Donlon et al. (2021): this Irish study showed a significant reduction in low GI cancer diagnosed and surgeries performed in the first wave. They note that cancer care has been slow to recover previous rates of cancer diagnosis as the pandemic continued.
Impact on patients	• Rodriguez et al. (2021): this study conducted in the United States showed that 46% of patients experienced a change in their care due to Covid-19, with 60% feeling very/extremely concerned that the pandemic would affect their cancer treatment, in particular among those with advanced cancer stages. • Beebe-Dimmer et al. (2022): reported a significant impact on African American cancer patients with more than 40% of the survivors reported some disruption in their access to medical care, as well as a significant proportion feeling anxious, depressed, and/or isolated during the COVID-19 pandemic, as well as engaging in negative changes in health behaviors affecting survivorship outcomes.

Table 4
Summary of ethics and social science research.

Themes	Discussion	Differences/agreement with expert guidelines
Triage	Beauchamp and Childress (2001) has been mobilized to conceptualize triage, in particular the principles of autonomy and justice.	Principle of justice: emphasize equal opportunity to receive elective surgeries (Brown et al., 2021b). Principle of autonomy: patients have the right to decide how to manage their cancer during the crisis (Kourie et al., 2020).
Patient disclosure, transparency, and right to appeal	Ethics of disclosure of non-options to patients as well as transparent patient communication, including vulnerable groups (Turnham et al., 2020; Shalowitz et al., 2020; Smith et al., 2021a, 2021b; González-Montero et al., 2020). Advocacy for patient rights, including right to appeal triage decisions (Turnham et al., 2020; McGuire et al., 2020).	In line with expert guidelines which advocate being honest and transparent with the patient during the crisis. Unknown if appeal process was put into place during the pandemic.
Effects on healthcare workers	Reorganization of care increased healthcare provider's psychological burden, in particularly by negatively influencing their ability to provide essential support (Edge et al., 2021). Oncologist burnout associated with stressors including disruption in care, fears about delays in cancer screening, diagnosis, and treatment, and exacerbating pre-pandemic burnout (Hlubocky et al., 2021). Frontline workers, in particular nurses, affected by stress and anxiety due to need to reorganize services (Labrague and de los Santos, 2020; Manzano García and Ayala Calvo, 2021; Hu et al., 2020). In addition, oncology residents often assigned roles and responsibilities that went beyond their training (Delaye et al., 2020).	Guidelines advocate paying attention to effects of pandemic on oncology healthcare workers; however, few tools are provided.
Effects on patients	Psychological impact documented including fear of COVID-19 and cancer progression, disruption of oncology service, cancer stage, and immunocompromised status (Momenimovahed et al., 2021; Ghosh et al., 2020). Reorganization of cancer services lead to stress and anxiety for patients, as well as communication issues with their healthcare providers (Edge et al., 2021; Košir et al., 2020).	While guidelines advocate for person-centered care and clear patient communication, guidelines merit being reworked to give healthcare providers tools for practice. Research on patient experiences in relation to the effects of triage decisions are needed.

Victoria Buisson: Data curation, Formal analysis, Writing – review & editing. **Zizis Kozlakidis:** Conceptualization, Funding acquisition, Supervision, Validation, Writing – review & editing. **Pierre Saintigny:** Conceptualization, Funding acquisition, Project administration, Supervision, Validation, Writing – review & editing.

Declarations of interest

Where authors are identified as personnel of the International Agency for Research on Cancer/WHO, the authors alone are responsible for the views expressed in this article and they do not necessarily represent the decisions, policy or views of the International Agency for Research on Cancer/WHO.

Conflict of Interest Statement

None to declare.

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